Coordinated Incoherent Scatter Radar and Fabry-Perot Interferometer observations of ionosphere-thermosphere disturbances during the March 17-18, 2015 great solar storm

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With a tremendous drop of the Dst index to ~ -230 nT, the geomagnetic storm during March 17-18, 2015 has been the largest during the current solar cycle. This storm was caused by a combined effect of the arriving solar Coronal Mass Ejection materials with high-speed solar wind streams originated from a nearby coronal hole. It was very fortunate for us to have coordinated an international campaign monitoring geospace disturbances during this period using ground-based facilities. These include incoherent scatter radars and Fabry-Perot Interferometers in the America sectors and other instruments in East Asia sectors, forming an observational network along approximately the 60W/120E meridional circle. The presentation will highlight these ground-based observations along with simultaneous DMSP in situ measurements and TEC from a network of dense GPS receivers, with a focuses on (1) the ion-neutral coupling processes at subauroral and mid-latitudes; (2) periodic midlatitude ionospheric disturbances; and (3) topside ionospheric variations. In particular, one of the most striking features to be discussed is the unexpected pre-midnight northward neutral wind surge, observed over multiple subauroral and midlatitude sites, accompanying strong westward winds developed at earlier times. We ascribe these wind disturbances to Subauroral Polarization Stream (SAPS).

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